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10/591,052	08/28/2006	Thomas Joseph Seal	12854-20446	6449

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EXAMINER	
SLIFKA, COLIN W	

ART UNIT	PAPER NUMBER
1793	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/591,052	SEAL, THOMAS JOSEPH	
	Examiner	Art Unit	
	COLIN W. SLIFKA	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 April 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14,19-29,31,32,34,35,40-46,48 and 51-54* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14,19-29,31,32,34,35,40-46,48 and 51-54* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 35, and 52-54 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 35 and 52 recite the limitation "the heap leaching" in lines 1-2 and 2, respectively. There is insufficient antecedent basis for this limitation in the claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims s 1-3, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hannifan et al (US 3,441,316) in view of Yan (US 4,346,936).

Hannifan teaches that well known methods for distributing the leach liquor to the heap usually involve spraying the leach solution over the surface of the dump or utilizing the irrigation principle by directing the solution through a series of parallel ditches cut into the surface of the dump from which the solution seeps into the body of the dump. Hannifan also teaches that these spray and drip irrigation-type systems result in

undesirable effects such as ponding, channeling, erosion and sloughing, which ultimately lead to deficiencies in the leaching process due to limited distribution of the leaching solution (col. 1, lines 47-63). Hannifan uses a plurality of wells to overcome these deficiencies.

Hannifan does not teach a preliminary step of heap leaching before implementing the wells.

While Hannifan and others proactively attempt to overcome the common problems associated with spray and irrigation methods, applicant anticipates problems and attempts to remedy the situation after the fact.

It would have been obvious to one of ordinary skill in the art at the time of the invention to first use the well known methods for applying leaching solution to a heap and then drill the wells as taught by Hannifan into deficient areas of the heap in order to introduce the leaching solution throughout the heap, as opposed to the surface of the heap, which increases efficiency of extraction.

In a further aspect, Hannifan does not teach selective remedial treatment of identified portions of the heap determined form surveying to be deficient in extraction of the component.

As stated above, Hannifan teaches that pooling/ponding, channeling, etc. occurs during the ‘conventional’ spray and drip irrigation-type leach systems. It is assumed that these problems are known because the heaps were surveyed, visually or otherwise, by those skilled in the art over the years. From the teachings of Hannifan, it is also known that the insertion of wells into these 'problem' areas, which are un-

leached or under-leached, is a practical and effective method of targeting these areas and ultimately increasing the efficiency of the leaching process.

It certainly would have been obvious to one of ordinary skill in the art at the time of the invention to selectively place wells into portions of a heap that are either un-leached or under-leached for any reason, among them pooling/ponding and channeling, in order to increase the efficiency and yield of the leaching process, because the problem of un-leached and under-leached portions of heaps is known as is the fact that wells are known to alleviate said problems.

Hannifan does not teach surveying comprising collecting data concerning properties within the heap and analyzing the data to identify portions of the heap deficient in component extraction.

Yan teaches that core samplings can be taken from already partially leached ores to calculate the proper molar ratio used for a pre-leaching treatment (col. 2, lines 58-64). Yan also teaches that after the treatment is finishes, the regular leaching can be restarted (col. 3, lines 17-18).

It would have been obvious to one of ordinary skill in the art at the time of the invention to take core samplings from a partially leached heap, as taught by Yan, in order to determine the conditions of the heap in each portion and how best to treat each portion prior to subsequent leaching. It would further have been obvious to one of ordinary skill in the art at the time of the invention to use this method in any heap treatment, such as that taught by Hannifan, and to analyze the samples for any practical reasons one of ordinary skill in the art would have.

Regarding claim 2, Hannifan teaches that metals may be recovered from ore by allowing a solution to percolate through the ore, where the desired metal dissolves into and impregnates the solution (col. 1, lines 37-46).

Regarding claim 3, Hannifan clearly teaches that the leach liquor is introduced through wells that are cased with liquid-impervious pipe and perforated at the levels where the liquor is to be delivered into the heap (abstract). Hannifan also teaches that a plug may be provided in each well that severs to control the level in the well at which leach solution flows into the material of the heap (col. 3, lines 59-62).

Regarding claim 8, Hannifan does not teach hydraulic fracturing; therefore the treatment of the heap through the wells is considered done without prior hydraulic fracturing.

Claims 4-7, 9, 13, 19-24, 31, 32, 34, 40, 41, and 51-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hannifan et al (US 3,441,316) in view of Yan (US 4,346,936) as applied to claims 1 and 2 above, and further in view of Spedden et al (US 3,815,957).

Hannifan, as combined with Yan above, teaches the leaching of metals by introducing leaching solution via excavated wells at different levels.

Hannifan does not teach hydraulic fracturing of the heap before the well treatment.

Spedden clearly teaches hydraulic fracturing of solid mineral deposits and waste dumps in order to increase permeability so that leaching liquid can be can be injected

through wells (col. 1, lines 31-53 and col. 2, lines 4-16). Spedden teaches the hydraulic fracturing as a way to make solution mining more effective (col. 1, lines 31-33), and that injection of leach solutions through wells and pipes is well known in the art (col. 1, lines 11-27).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the hydraulic fracturing methods as disclosed by Spedden with the leaching techniques as taught by Hannifan and Yan to increase permeability and, consequently, efficiency.

Regarding claims 5 and 6, Spedden teaches that the casing of each well is perforated in the zone to be fractured (col. 2, lines 34-35). Spedden also teaches that propping agents can be pumped with the fracture fluid into the formation through the well(s) as deemed necessary (col. 2, lines 44-48) and that the cycle can be repeated several times through the same injection well or wells for additional fracturing (col. 2, lines 55-57).

Regarding claim 7, Hannifan, as shown above (claim 3), teaches the use of a plug to control the level in the well at which leach solution flows into the material of the heap. The level is controlled by raising or lowering the plug in the well (col. 3, lines 59-65).

Regarding claim 9, Hannifan teaches that metals may be recovered from ore by allowing a solution to percolate through the ore, where the desired metal dissolves into and impregnates the solution. The metal-laden solution draining from the heap is collected and treated to extract the metal (col. 1, lines 37-46).

Regarding claims 13, and 52-54 and under the assumption that "the heap leaching" step of claim 52 is referring to the "…component extraction by heap leaching" of claim 1, it would have been obvious to one of ordinary skill in the art at the time of the invention to continue conventional "surface" heap leaching both during and after the treatment through the wells as considered necessary to further the extent of extraction.

Regarding claims 19-21, Hannifan clearly describes a method for extracting copper in a solution created by mixing water and $Fe_2(SO_4)_3$ (col. 1, lines 37-46).

Regarding claims 22-24, Hannifan teaches that during the drilling (for the wells), when visual inspection of the cuttings indicates copper mineralization, a standard sampling of hole cuttings are made at five to ten foot intervals (col. 4, lines 23-26).

Regarding claim 31, Hannifan clearly teaches the recovery of copper from copper ore (col. 1, lines 37-40).

Regarding claim 32, Hannifan teaches that the wells may need to be substantially below the surface, with an example of 200-400 feet (col. 4, lines 53-54).

Regarding claims 34, 40, and 41, Hannifan teaches a leaching process for recovering metal values from a bed of metal-bearing materials, specifically recovering copper from copper ore (col. 1, lines 27-32).

Regarding claim 51, Hannifan teaches that the spacing of the wells may be varied between, for example, 150-foot grid spacing at one extreme and 25-foot spacing at the other extreme.

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hannifan et al (US 3,441,316) and Yan (US 4,346,936) in view of Spedden et al (US 3,815,957) as applied to claims 1, 2, and 4 above, and further in view of Johnson et al (US 4,381,873).

Hannifan, as combined with Yan and Spedden above, teaches the use of hydraulic fracturing methods to aide in heap leaching processes in which leaching solution can be administered through wells.

Hannifan does not specifically teach separate steps of further leaching.

Johnson teaches a method of fracturing an ore body and subsequently leaching minerals through wells (col. 2, lines 41-47 and col. 10, lines 23-24) and actually refers to the '957 Spedden patent for additional details of hydrofracturing techniques (col. 3, lines 60-63). Johnson teaches that when the pregnant liquid leach solution is substantially reduced in the desired mineral/metal content, further mineral deposits can be leached, if desired, with water by the passage of water through the fluid annulus (col. 10, lines 11-14).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the well system as taught by Hannifan, and to further leach desired minerals/metals with a leaching solution as taught by Johnson, as necessary to further the extent of extraction.

Regarding claim 12, it would have been obvious to one of ordinary skill in the art at the time of the invention to continue conventional "surface" heap leaching during the

additional treatment through the wells as taught by Johnson, as considered necessary to further the extent of extraction.

Claims 14, 35, 42, and 44-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hannifan et al (US 3,441,316) and Yan (US 4,346,936) in view of Spedden et al (US 3,815,957) as applied to claims1, 2, and 4 above, and further in view of Young et al (US 6,471,743).

Hannifan, as combined with Yan and Spedden above, teaches the use of hydraulic fracturing methods to aide in heap leaching processes in which leaching solution can be administered through wells. Hannifan teaches that the component to be extracted may be a base metal, as applied to claims 34 and 40 above.

However, neither Hannifan nor Spedden mention specific minerals or metals besides copper.

It is noted that it would have been obvious to one of ordinary skill in the art at the time of the invention to introduce any known leaching solution into the system as taught by Hannifan when combined with Spedden as discussed above, accordingly, in order to leach any desirable mineral/metal. This can be applied with regard to claims 44 and 45.

Regarding claims 14, 35, 42, and 46, Young teaches that cyanide, thiosulfate, thiourea and halides are used in leaching gold, silver, and oxides (col. 1, lines 18-20). Young also teaches methods for leaching valuable minerals, such as cobalt, nickel, copper, lead, and zinc (col. 2, lines 2-6).

It would have been obvious to one of ordinary skill in the art at the time of the invention to introduce the leaching solutions, as taught by Young, into the system as taught by Hannifan when combined with Spedden as discussed above, to leach desirable minerals/metals from corresponding ore heaps.

Claims 25-27, 29, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hannifan et al (US 3,441,316) and Yan (US 4,346,936) in view of Spedden et al (US 3,815,957) as applied to claims 1, 2, and 4 above, and further in view of Lesty et al (US 4,756,887).

Hannifan, as combined with Yan and Spedden above, teaches the use of hydraulic fracturing methods to aide in heap leaching processes in which leaching solution can be administered through wells.

Hannifan does not teach noninvasive data collection techniques to determine properties of the heap.

Lesty clearly teaches that the permeability of the heap material can be determined by geophysical methods (col. 3, lines 14-18), such as electrical or electromagnetic methods, or by geological surveys (col. 2, lines 17-24). Drilling methods, which are taught by both Hannifan and Spedden, are considered to be geological surveys. Lesty teaches that geophysical survey methods are interchangeable with geological survey methods.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the electromagnetic geophysical survey method, as taught

by Lesty, with the system as taught by Hannifan when combined with Spedden, as discussed above, as Lesty teaches that geophysical survey methods are interchangeable with geological survey methods.

Regarding claim 43, Hannifan teaches that the component to be extracted may be a base metal, as applied to claim 34 above.

Hannifan does not specifically teach that the material to be leached is uranium.

Lesty clearly teaches that while the method (as taught by Lesty) has been described for the treatment of uranium ores, it can be utilized for the leach of numerous other minerals in heaps (col. 5, lines 12-14).

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the leaching system as taught by Hannifan when combined with Spedden as discussed above interchangeably with heaps of copper ores as taught by Hannifan and Spedden, uranium ores as taught by Lesty, or any other desirable ores as Lesty explicitly states that the process may be utilized for the leach of numerous other minerals in heaps.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hannifan et al (US 3,441,316), Yan (US 4,346,936), Spedden et al (US 3,815,957), and Lesty et al (US 4,756,887) as applied to claims 1, 2, 4, and 25-27 above, and further in view of Milsom (*Field Geophysics 3rd Edition*).

Hannifan, as combined with Yan, Spedden, and Lesty above, teaches the use of hydraulic fracturing methods to aide in heap leaching processes in which leaching

solution can be administered through wells, and the use of passive geophysical survey techniques to help in determining excavation areas for the wells.

Lesty does not specify using gravity survey techniques as the geophysical survey.

In Chapter 2, labeled "Gravity Method," Milsom teaches that differences in rock density produce small changes in the Earth's gravity field that can be measured using portable instruments known as gravity meters or gravimeters (Chapter 2 abstract, page 29).

While Milsom does not specifically teach the application of these methods to heap leaching, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement "gravity surveys" in the use of passive geophysical survey techniques to help in determining excavation areas for the wells as taught by Hannifan when combined with Spedden and Lesty as discussed above.

Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hannifan et al (US 3,441,316) and Yan (US 4,346,936) in view of Spedden et al (US 3,815,957) as applied to claims 1, 2, and 4 above, and further in view of Jones (US 5,223,024).

Hannifan, as combined with Yan and Spedden above, teaches the use of hydraulic fracturing methods to aide in heap leaching processes in which leaching solution can be administered through wells.

Hannifan does not teach the modification of pH in the heap.

Jones teaches that a high acid concentration is desirable during the leaching stage, yet undesirable during the subsequent solvent extraction stage, due to unfavorable equilibrium conditions, which are created and lead to higher equipment and working costs (col. 1, lines 60-66). Jones also teaches attaining acidic leach liquor containing dissolved copper and then reducing the acidity of the leach liquor by effecting percolation leaching of a bed of low grade copper ore with said acidic leach liquor, whereby the pH of the leach liquor is raised (col. 2, lines 12-17).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the well and hydraulic fracture methods as taught by Hannifan when combined with Spedden as discussed above with the method of modifying the pH of the leach liquor as taught by Jones in order to avoid high equipment and working cost as well as unfavorable equilibrium conditions.

Response to Arguments

The objections, to both the specification and the claims, from the prior office action have been removed based on applicant's arguments and amendments. Applicant's clarification of Claim 1 that the quoted phrase does not require that the heap leaching is performed as part of the method recited in Claim 1, but rather states a property of the heap at the time of the surveying (Page 11, Par. 2) is accepted and appreciated. This understanding, however, has necessitated the 35 U.S.C. 112, Second Paragraph rejection over claims 35, and 52-54. There is a lack of antecedent basis for "the heap leaching" of claims 35 and 52, as "the heap leaching" step has not

been defined in a previous claim. Claims 53 and 54 are likewise rejected for being dependant from claim 52. It is assumed that "the heap leaching" refers to the “subjecting” of “the heap to component extraction," which is commensurate with the rest of the claims.

Applicant's amendments have overcome the 35 U.S.C. 112, Second Paragraph rejections over claims 3, 12, 13, 53, and 54.

Applicant's arguments with respect to claims 1-14, 19-29, 31, 32, 34, 35, 40-46, 48, 51, 53, and 54, claim 1 in particular, have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments and concerns have been encompassed in the above rejections.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to COLIN W. SLIFKA whose telephone number is (571)270-5830. The examiner can normally be reached on Monday-Thursday, 10:00AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Melvin Curtis Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/COLIN W SLIFKA/
Examiner, Art Unit 1793

CS
April 26, 2009

/Melvin Curtis Mayes/
Supervisory Patent Examiner, Art Unit 1793